

REMARKS

Claims 27-38 are all the claims pending in the application. Claims 27, 28, and 30 are the only independent claims.

Specification Objection

The Examiner has objected to the Specification because it recites that the recording medium may include “a radio medium”, which is allegedly considered to be an unstatutory term. In view of the amendment to the Specification being made herein, withdrawal of the objection is respectfully requested.

Claim Rejections - 35 U.S.C. § 101

Claims 27-36 are rejected under 35 U.S.C. § 101 because the claims allegedly do not meet the requirements of 35 U.S.C. § 101. In view of the amendments to independent claims 27, 28, and 30, Applicants submit that the claims comply with the requirements of 35 U.S.C. § 101.

Claim Rejections – 35 U.S.C. § 103

Claims 27, 28, and 30 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the teachings of the instant application in view of U.S. Patent No. 6,275,532 to Hibi *et al.* (hereinafter, “Hibi”). For at least the following reasons, Applicants respectfully traverse the rejection.

Applicants respectfully submit that claim 27 is patentable over the proposed combination of the AAPA and Hibi. For example, claim 27 relates to a computer readable medium storing a computer program for causing a computer to implement functions of coding a motion vector. The functions comprise, *inter alia*, performing an affine motion estimation to obtain affine motion parameters, and converting the affine motion parameters to a predetermined number of

translational motion vectors. The Examiner contends that the Specification, on page 2, lines 8-11, and page 2, line 19 to page 3, line 13 teaches these features. Applicants respectfully disagree.

For instance, Applicants respectfully submit that the conventional motion estimation methods disclosed in the Specification do not suggest the above-noted features of claim 1. For example, there is no conversion of the affine motion parameters to a predetermined number of translational motion vectors in the conventional motion estimation methods disclosed in the Specification as alleged by the Examiner.

On the contrary, the Specification states that in the translational motion model used by standards such as H.261, H.263, MPEG-1, and MPEG-2, “the motion vectors of all pixels in a block are fixed as one vector. However, in the case of affine motion, as expressed in Equations (1a) and (1b), a motion vector with respect to each pixel location is variable” (Specification, page 3, line 4-10, emphasis added). That is, in the conventional motion estimation methods disclosed in the Specification, the affine motion estimation and the translational motion model are separate methods to estimate motion, and are independent of each other. There is no conversion between the two models. The Specification further discloses that since the affine motion parameters are not affected by neighboring blocks, it is very difficult to predictively encode motion information as employed in the translation motion model, which relies on motion vectors which are predictively encoded (Specification, page 6, lines 9-19). The present invention mitigates these deficiencies by providing a method to convert the affine motion parameters to a predetermined number of translational motion vectors, as claimed.

In view of the above, Applicants respectfully submit that the conventional motion estimation methods disclosed in the Specification do not teach or suggest converting the affine motion parameters to translational motion vectors, much less converting the affine motion parameters to a predetermined number of translational motion vectors. Accordingly, Applicants respectfully request the Examiner to withdraw the 35 U.S.C. § 103(a) rejection of claim 27.

Claim 28 recites a computer readable medium storing a computer program for causing a computer to implement functions of coding a motion vector, said functions comprising, *inter alia*, converting the affine motion parameters to a predetermined number of translational motion vectors. Therefore, Applicants respectfully submit that claim 28 is patentable for reasons similar to those given above with respect to claim 27.

Claim 30 recites a computer readable medium storing a computer program for causing a computer to implement functions of decoding a motion vector, said functions comprising, *inter alia*, converting obtained translational motion vectors to affine motion parameters. The Examiner contends that the decoder of the combination of the instant application and Hibi will perform the complimentary operations of the corresponding encoder. Applicants respectfully disagree.

Specifically, since it has been shown above with respect to claim 27 that the encoder resulting from the proposed combination of the instant application and Hibi does not convert the affine motion parameters to a predetermined number of translational motion vectors, the complimentary operations of the corresponding decoder cannot disclose or suggest converting obtained translational motion vectors to affine motion parameters. Therefore, Applicants

respectfully submit that claim 30 is patentable over the teachings of the instant application and Hibi.

Claims 29 and 31-36 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the teachings of the instant application and Hibi, and further in view of U.S. Patent No. 6,944,227 to Bober. For at least the following reasons, Applicants respectfully traverse the rejection.

Claims 29 and 31-36 depend from claims 27, 28, and 30. Since Bober does not cure the deficient teachings of the conventional motion estimation methods disclosed in the instant application and Hibi with respect to claims 27, 28, and 30, Applicants respectfully submit that claims 29 and 31-36 are patentable *at least* by virtue of their dependency.

New Claims

Applicants respectfully submit that new claims 37 and 38 are patentable at least by virtue of their dependency. Moreover, the prior art of record does not teach or suggest that:

the converting the affine motion parameters to the predetermined number of translational motion vectors comprises obtaining motion vectors of the center points of sub-blocks A, B, C, and D of the current block by using $(v_{x,A}, v_{y,A}) = (a_0 + a_1\alpha + a_2\alpha, a_3 + a_4\alpha + a_5\alpha)$, $(v_{x,B}, v_{y,B}) = (a_0 + 3a_1\alpha + a_2\alpha, a_3 + 3a_4\alpha + a_5\alpha)$, and $(v_{x,C}, v_{y,C}) = (a_0 + a_1\alpha + 3a_2\alpha, a_3 + a_4\alpha + 3a_5\alpha)$ based on

$$v_x(i, j) = 1/(2\alpha)(4\alpha - i - j)v_{x,A} + 1/(2\alpha)(-2\alpha + i)v_{x,B} + 1/(2\alpha)(-2\alpha + j)v_{x,C}, \text{ and}$$

$$v_y(i, j) = 1/(2\alpha)(4\alpha - i - j)v_{y,A} + 1/(2\alpha)(-2\alpha + i)v_{y,B} + 1/(2\alpha)(-2\alpha + j)v_{y,C},$$

where the size of the current block is $S \cdot S$, and the constant α is $S/4 + 1/2$, as set forth in claims 37 and 38.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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CUSTOMER NUMBER



Peter A. McKenna
Registration No. 38,551

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